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U. S. DEPARTMENT OF AGRICULTURE.

REPORT

OF

THE POMOLOGIST

FOR

1892.

BY

H. E. VAN DEMAN.

FROM THE REPORT OF THE SECRETARY OF AGRICULTURE FOR 1892.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.

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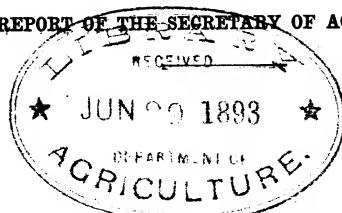
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REPORT OF THE POMOLOGIST.

SIR: I have the honor to submit my seventh annual report as Pomologist of this Department. There have been no changes in the office force of this division during the year. The work of tabulating the reports of correspondents preparatory to embodying the same in special reports is progressing as rapidly as possible with the force at command.

Mr. J. S. Harris, of Minnesota, was appointed a special agent to serve during August, September, and October, for the purpose of investigating the condition of fruit growing in the extreme northern part of the Mississippi Valley. His report is herewith transmitted, with the hope that it may enable those who live in that vast section of our country to proceed more intelligently in the culture of fruits.

Several other sections have been visited by members of the division, and the important points of information gained will be found in this report. Several national and State horticultural society meetings have been attended by representatives of the division, and it is believed that thereby good has been done.

No special publications have been issued during the year, because of the long time needed in their preparation and especially for the completion of the necessary illustrations. The complete monograph on our native wild grapes is ready for the printer and awaits the action of Congress to furnish the funds necessary for its publication.

Respectfully submitted,

H. E. VAN DEMAN,
Pomologist.

Hon. J. M. RUSK,
Secretary.

THE FRUIT CROP OF THE YEAR.

The fruit crop of the United States for the year 1892 was below the average, and some kinds of fruit were very scarce. Apples have been a failure in a large part of the territory where they are usually abundant. In the States of Maine, Connecticut, Colorado, Oregon, and Washington the crop has been reasonably good, and in northern Michigan, southern Missouri, and a few sections in New York, Virginia, and western North Carolina apple orchards have yielded fairly well, and in all cases the prices have ruled high.

Peaches have also been scarce. California led the country in the production of this fruit. Southern Connecticut had a fair crop, and the same is true of the western parts of Maryland, Michigan, and Colorado, also southern Missouri and a few places in Arkansas, Arizona, New Mexico, and Georgia.

The pear crop of the Pacific slope was very good, but in all the Eastern States the contrary is true. There is an increasing demand in the market for the Keiffer pear, notwithstanding its poor quality, except when cooked, and planters are trying to meet the demand. In the Southern States this pear is much better than when grown in the North, as it is not only larger, but of better flavor. The very vigorous constitution of the tree is a point in its favor, as it does not yield readily to fire-blight, and often bears when most varieties fail.

Plums (including varieties called prunes) were not so plentiful. The native varieties, such as Wild Goose, bore better than the larger and better European kinds, especially in the Eastern States. The varieties brought from Japan seem to be well adapted to this country and are now being generally planted both North and South. Some of them (especially one called Kelsey) are too tender except for the climate of the Gulf States, but the majority are as hardy as the European varieties. They bear profusely, and the fruit is of good size and quality.

Cherries have been remarkably scarce, except in the Pacific States. Oregon and Washington produced the most and the best. Quinces have, on the other hand, done fairly well, as the tree puts out its blossoms very late, and thus they escaped the spring frosts, which as a rule were very destructive to fruits this year.

The apricot is not grown with success on the Pacific side of the Rocky Mountains, except in a small way, because of the curculio. The crop in California has been quite abundant.

Citrus fruits have borne well, although spring frosts in 1891 cut short the crop of oranges by killing the blossoms in some parts of Florida and California. Notwithstanding this, the markets were well supplied with oranges of good quality and at reasonable prices. Foreign-grown oranges, especially those from the Mediterranean region, are not in favor when there is plenty of the native product, and as they arrive here principally in the spring and summer when our own oranges are out of season, they do not seriously interfere with the home-grown product. Early in September oranges are received from the West Indies, principally from Jamaica, and about a month later the first consignments of the Florida and Louisiana crop are sent to market. Mexico is sending large quantities of oranges of very good quality to this country, which come chiefly by way of El Paso, Tex. Although many of them have to be transported long distances overland packed on burros, they are shipped into the United States in fairly good condition and are meeting with good sale in St. Louis, Mo., and other Western markets. Our own growers are already feeling the effects of this competition, which was mentioned in my report of last year. They come early in the winter and thus compete with the Florida crop. Arizona oranges come next in point of season, and although the quantity is yet quite small, owing to the recent beginning of orange planting there, the quality is good. The time is not far distant when Arizona oranges will make an impression on the market. California oranges ripen about two months later than the bulk of the Florida product and have for years been an important factor in the market, especially in the Western and central States. As yet, but few have been sent to the Eastern markets.

Last year I stated that an attempt was being made to ship oranges direct to England from Florida. Until this year only a few small lots had been sent, but on November 17 the steamer *Ethelwold* sailed for Liverpool from Fernandina with 9,566 boxes of oranges. The ship encountered rough weather and the hatches had to be shut down a part

of the time, which caused some damage to the fruit, but the cargo sold at an average of \$2 per box in London, and netted the grower \$1.05 at Fernandina, Fla., which is a good price considering that some of the oranges were below the average sizes, including a good many russets; also that there was a very unusual glut of Mediterranean oranges then on the market, and the further fact that over half the cargo was held more than a week after landing, which added to the damage by rot. With improved ventilation on ship board there is no reason why Florida oranges may not be sold in large quantities at a profit in England.

The entire orange crop of the United States does not now exceed 5,000,000 boxes, but it is estimated that within ten years it will reach 40,000,000 boxes, judging from the present rate of planting. Allowing for an increased per capita consumption of oranges by our own people, there would still remain a large proportion of the crop which could be exported to foreign countries.

Grapes have been plentiful in all sections of the country and the price has been low. In California there is an overproduction of wine grapes, and the raisin crop is so large as to have almost reached the limit of profit to the producer. In New York there is complaint that grapes have been sold at ruinously low prices.

Berries of all kinds have been plentiful, especially the strawberry. The frost in some sections of the Southern States seriously damaged the strawberry crop, but in the North there was little trouble of this kind; drought at picking time prevented the proper development of the fruit. The general interest in the growing of small fruits is increasing, but there is plenty of room for improvement in this direction, especially by the ordinary farmers, who, as a rule, sadly neglect to supply their families with an abundance of these delicate and easily grown fruits.

THE STRAWBERRY DISTRICTS OF THE SOUTH ATLANTIC COAST.

In my last annual report mention was made of the large strawberry-growing interests of eastern Virginia, and the methods of cultivation and marketing prevailing there were described at some length. In pursuing further the investigation of the methods and practice followed in berry-growing districts, the assistant pomologist, Mr. W. A. Taylor, in April and May visited those parts of Florida, South Carolina, and North Carolina where the strawberry is grown for market on an extensive scale.

FLORIDA.

In Florida strawberries are grown in a small way, for home use and to supply the numerous winter-resort hotels, in almost all parts of the State. Owing to the lightness and dryness of the soil and the consequent difficulty experienced in maintaining the plants through the dry season, the growth of this berry for market on a large scale is limited to a few favorably situated localities.

The shipping districts are all in the northern part of the peninsula along the railroads leading northward to the great cities of the Atlantic coast. The largest acreage is in Alachua and Bradford counties, the principal shipping stations this year having been Gainesville, Starke, and Lawtey. At the last-named place the industry has been developed since the disastrous freeze of 1886 practically destroyed the orange groves, and it is now the leading fruit crop of that section.

The soil about Lawtey is a heavy sand from $1\frac{1}{2}$ to 2 feet deep, containing a good deal of vegetable matter and resting on a compact clay subsoil. It is about 130 feet above sea level, flat, and during the rainy season is often covered with water to a depth of 1 or 2 inches, like the rest of the "flat woods" country. In consequence of this, the matter of drainage has to be looked after and is usually accomplished by throwing the land up into beds or "lands" from 8 to 20 feet in width, with deep furrows between. The soil is well plowed and a dressing of commercial fertilizer, rich in potash and phosphoric acid, is well harrowed in a few days before the planting time, which is found by the best growers to be late in August or September, near the end of the summer rains. If planted earlier, the blossom buds are found to develop so early in the winter as to be damaged by the frost in January and February. And while early fruit is the main object of the grower, it is found that there is a limit to profitable earliness, as the Northern demand is not heavy during the winter months.

Plants are taken from old beds left for the purpose, no particular care being taken except to secure new plants, either runners or seedlings, of which the old beds are full, owing to the large amount of seed left on the plants at the close of the picking season. The planting is done by hand, with spade or dibble, in rows 2 feet apart or in double rows close together, and 1 foot apart in the row. This requires about 20,000 to the acre and makes horse cultivation impossible. The ground is frequently stirred by wheel hoes and all weeds and grass are kept out by hand-weeding until the early blossoms appear, when a mulch of wire-grass or pine straw is applied and the plants are "laid by." By this time, if the season has been favorable, the plants have formed large stools, no runners having been allowed to root, and the field presents the appearance of having been planted in narrow rows, though the hill system is scrupulously followed.

In the absence of killing frosts the picking season from the same plants may be expected to continue for four or five months, beginning about February 1. A field of Neunan strawberries near Lawtey, planted in double rows, is shown in Plate I, Fig. 1.

The berries ripen very irregularly at first and, though an occasional quart is secured earlier, the shipping season proper does not begin until late in February nor continue later than April. The fruit is picked as soon as it shows color and until April is shipped in 32-quart crates, by open express, to points as far north as New York, Boston, and Chicago; but as soon as the spring is fairly opened in the North, and not till then do the larger pickings come, refrigeration during shipment is necessary. This is accomplished either by using the refrigerator car, now in general use for the transportation of perishable fruits, or the "pony" refrigerator, which answers the same purpose and has the advantage of being adapted to the needs of small shippers who desire to ship their own fruit. This is a cheap double-walled refrigerator made of dressed boards, in the bottom of which are two chambers holding from 32 to 128 or more quart baskets of berries. The ice is held in a galvanized-iron tray, which covers the entire top of the inner chambers and from which a flue of like material extends downward between them, affording an escape for the water from the melted ice, through holes covered with sponge. The best features of this refrigerator are covered by patents and the shippers pay a small royalty for the privilege of using them. The refrigerators are thoroughly cool before being filled with berries, and about 200 pounds of artificial ice, costing \$1.50 per cwt., are required for icing a 2-bushel crate.

It will be observed that this method of shipment is expensive and only available when prices are high, as the freight and ice charges amount to about 10 cents per quart. For a few of the early shipments the selling price sometimes runs as high as 75 cents or \$1 per quart, but the bulk of the crop rarely sells for more than 40 or 50 cents, with occasional shipments that reach the market in bad order, or during cold and stormy weather when the demand is light, selling very much lower. The lowest selling price for which growers feel that they can afford to risk the shipment of fruit is about 25 cents per quart, and when sales fall below that the shipping ceases.

The yield of marketable fruit varies greatly from year to year, depending on the damage done by frost and drought and the consequent length of the shipping season, as well as on the condition of the markets. It probably does not average more than 1,500 or 2,000 quarts per acre, with a balance of 500 quarts that ripen after the shipping season closes. These are only available for home use, wine-making, etc.

But one variety (the Neunan Improved—a seedling of the old Neunan, long grown through the South) is grown in any quantity. It is a small, rather rough, conical berry, of very poor quality until full ripe—a condition which it only reaches in these market plantations after the close of the shipping season. A few Hoffman plants are grown, but, though slightly earlier than the Neunan, this variety has not proved profitable in Florida. For home use, the Michel is the favorite among those who have tested the newer varieties. Most of the Northern varieties fail entirely on account of the spot blight, and the Neunan is often damaged by it. Two crops are usually picked from the same planting, the first furnishing the larger berries and the second the larger number of quarts.

The business is fairly profitable, considering the capital invested, and in some seasons very good results are obtained. Sometimes as high as \$500 per acre has been secured from a single crop. The danger from the hard frosts in January, February, and March is great, however, and this, with the excessive transportation charges, sometimes amounting to more than \$1,000 on a single car load, forms the chief drawback to a further increase of the acreage.

The method of culture is adapted to the garden rather than the field; and its most obvious drawbacks are the absence of horse cultivation and the practice of selecting plants for new beds from old ones exhausted by fruit production and full of miscellaneous seedlings—a practice almost certain to result in the degeneration of the variety.

SOUTH CAROLINA.

The Florida berries are followed in the markets by those from South Carolina. The principal shipping district is in the neighborhood of Charleston, where the business has been carried on for many years. The conditions here are very different from those at Lawtey. The berries are mostly grown on land worth from \$100 to \$500 per acre, and as a second crop. The soil is a sandy loam lying mainly less than 30 feet above the sea level. It is not deep, but is well underdrained and in a high state of cultivation, the growing of truck crops having been the leading industry there since the close of the late war. The common practice here is to follow a crop of early potatoes harvested in May on ground well fertilized, with strawberries planted in August. The ground is thoroughly prepared, and every precaution is taken to secure a uniform stand of strong plants. Plants are taken up with a simple

transplanter having trowel-shaped blades and two handles, so that a ball of moist earth is taken with the roots, and their growth is but little checked by removal. Though an expensive method, the growers almost universally practice it, to insure a good "stand" and "start" in the new field.

The rows are $2\frac{1}{2}$ to 3 feet apart with plants 12 to 15 inches apart in the row, and when the cultivation and hoeing are thoroughly done, the growth is very rapid and vigorous. No runners are allowed to root, and as soon as fruit appears, cultivation is stopped and a heavy mulch of pine straw (needles, of the long-leaved pine) is applied over the entire surface. This material is secured by the car load, some 20 miles distant, at a cost of \$10 or \$12 per ton, and after the picking season is over it is raked off to be used a second season. A view of a field of Hoffman berries on the farm of Mr. John Nix at Mount Pleasant, near Charleston, is shown in Plate I, Fig 2.

The shipping begins about the last of March and continues through April. During this time the fields are picked over every day. The berries are shipped mainly by fast freight to New York, the total shipping expense being about $7\frac{1}{2}$ cents per quart. Such shipments are profitable till the wholesale price in New York drops below 20 cents. The yield of marketable fruit is estimated at 4,000 quarts per acre, and with the present acreage and prices the business is profitable, as the ground is only occupied by the strawberries from August to May. After the berries are picked enough plants are retained to furnish runners for the new beds, the remainder being at once plowed under.

The packing of the fruit is very carefully attended to at Charleston, the berries as they are brought in from the fields by the pickers being emptied, assorted, and repacked before being placed in the crates for shipping. To reduce the bruising of the fruit to a minimum in this process, an assorting device not seen elsewhere is in common use. This device consists of a horizontal endless belt of canvas 12 to 15 inches wide, which is kept in motion by wooden pulleys at each end and runs in the bottom of a smooth, shallow, flat, board trough 8 to 12 feet long. The motion of the belt is secured by turning a crank attached to one of the pulleys. This gives a broad soft moving surface on which the berries, poured from the picking baskets, pass before the assorters, who pick out the culls as they move along. At the end of the belt the stream of berries is divided by a smooth wedge-shaped block of wood and directed into two 1-quart baskets by the deft fingers of the packers, who see that the baskets are well filled and topped out. The assorting device is home-made, costs but a few dollars, and the Charleston shippers believe that by its use they realize prices enough higher to pay them well for the extra handling. Certain it is that the Charleston berries at the height of their season are not excelled for cleanliness, uniformity of size, and careful packing—three of the important points in strawberry marketing.

No other variety is grown than the Hoffman, which originated with Mr. H. Hoffman, of Charleston, in 1877, from seed of the Neunan. Its characteristics are noted in my report on the Norfolk strawberry industry last year, therefore it is unnecessary to describe it further than to say that it is an early, smooth, dark crimson berry, very firm and rather sour till fully ripe. From observations made at Charleston it is evident that, as grown and marketed there, it is superior to the same variety grown at Norfolk, probably because of the more thorough cultivation and fertilization at the former place. The objects sought are the same at both points—that is, early firm fruit of good color. The



FIG. 1.—STRAWBERRY FIELD NEAR LAWTEY, FLA.



FIG. 2.—STRAWBERRY FIELD NEAR CHARLESTON, S. C.

Norfolk grower aims to secure this by planting in spring and allowing the runners to root till broad tangled rows are formed which prevent cultivation and permit the growth of grass and weeds. He secures clean and early fruit at the expense of size. He risks less expenditure of money and consequently loses less by killing frost than does the Charleston grower. The latter plants a smaller area and spares no reasonable expense in cultivation and care, and as a result gets a much larger yield of larger fruit and apparently nets more for it.

It is evident that the Norfolk method would not be profitable on the high-priced lands about Charleston, but it is not so clear that the Charleston method would not pay in the long run on the cheaper lands of Norfolk.

NORTH CAROLINA.

Until very recently there was a perceptible break in the supply of strawberries in the market between the wane of the Charleston crop and the first receipts from Norfolk. This was noticed by growers, and as a result of their investigation and testing of localities a considerable interest has been developed in eastern North Carolina. From Wilmington northward to Goldsboro, along the Wilmington and Weldon Railroad, and to some extent further west in this State, there are, at almost every station, market plantations of strawberries. Their distance from the coast renders them more liable to damage by frost than at Charleston; but to partially counterbalance this there is available for planting a large area of suitable low-priced land.

The berry fields of eastern North Carolina vary in elevation from 30 feet to 150 feet above sea level. The soil consists of light sandy loam, with a tenacious clay subsoil, often but a few inches below the gently rolling surface. The land needs underdraining, but most of the growers yet depend on surface furrows.

The system here is the narrow row, the plants being put out in February, 12 to 18 inches apart, in rows 3 feet apart on narrow ridges. Cultivation is continued through the winter. A heavy mulch of pine straw is then applied and left on till spring. For fertilizer, 40 or 50 bushels of cotton seed is cultivated in, close to the rows, in December, and in January or February a top-dressing of 450 to 500 pounds of commercial fertilizer, rich in potash, is broadcasted over the field. Picking, packing, and marketing are about the same as at Charleston, except that less care is taken and the fruit is not assorted. Shipping expenses probably average about $5\frac{1}{2}$ cents per quart to New York, most of them going forward without refrigeration. Shipments begin from April 15 to May 1, and continue from two to six weeks, according to the season. The average yield is about 2,500 quarts per acre; and prices range from 40 cents down to 10 cents per quart. The lowest wholesale price which leaves a profit for the grower is 15 cents per quart. To secure a price above this is the aim of the growers, and in their endeavor to accomplish it, they have attempted to secure varieties that can be depended on to ripen with the Hoffman and be less susceptible to frost when in blossom than that variety.

A number of local varieties are grown extensively, notably the Westbrook and the Murray, both with imperfect blossoms, and the Porter and the Katie, which are perfect flowered varieties. The Hoffman has not been discarded, but is not grown as largely as it was a few years ago. It can not be said that any of these new varieties are better market berries than the Hoffman, where it succeeds; but for the needs of

the section where they have originated, and to meet the demand for berries that will ripen between the Hoffman at Charleston and the same variety at Norfolk, there is a place for them. They are firm berries, rather light in color, and, except the Westbrook, irregular in outline, of only medium quality and size. Numerous other seedlings are being tested at various points, some of which promise to be of local value and perhaps for wider dissemination.

One point of particular interest here is the dependence placed by some of the leading growers in the frost predictions of the Weather Bureau. By watching these predictions they are able to determine with much accuracy the danger to be apprehended in their locality, and, as the news of threatened frost reaches them a few hours in advance of sunset, to partially guard against damage to the crops. By placing their entire working forces at work with light hand-rakes they are able to cover the plants with the mulch of pine straw that lies on the ground between the rows, and thus to protect the blossoms from injury.

FRUIT-GROWING IN COLORADO.

An official visit was made to Colorado during the last week in August and the first half of September for the purpose of obtaining definite information concerning the condition of fruit culture in that State. East of the mountains the country is a series of rolling plains which gradually merge into the foothills. There is no natural timber growth except narrow belts along the streams, composed principally of two species of cottonwood (*Populus angustifolia* and *P. monilifera*) and box-elder (*Acer negundo*). The wild grasses are not thickly set, and a scattering growth of sage-brush, with occasional clumps of cactus and yucca, together with a very dry surface, gives the country a desert appearance.

The soil is a sandy loam, loose and easily worked, with almost no stones or other obstructions, and in point of natural fertility is up to the average. The rainfall is very light, there being rarely more than 6 inches annually east of the mountains. Irrigation is essential, and where water is thus applied to the land crops that are grown in the Central States are very successful, except those requiring a long hot season. The climate is usually mild, but subject to sudden cold waves, which have a tendency to evaporate the moisture from trees and all fruit plants to a damaging degree. Hence it is necessary to lay down all grape vines, blackberry, and raspberry canes, etc., during winter, and to cover them with earth.

About Denver, Colorado Springs, and all the cities and towns east of the mountains, there is a large and increasing interest in berry culture. The strawberry seems to flourish well in this loose rich loam when irrigated. Jucunda, a variety thoroughly tested and long ago discarded in the Eastern States because of its weakly root system, is a favorite among market-growers in Colorado. Nothing that I have seen in any State exceeds the luxuriant growth of this strawberry in eastern Colorado. Of course, covering with straw or other mulch is necessary in winter time. I was much surprised to notice the flourishing condition of English gooseberries, which, on account of mildew, are rarely successful in the Eastern States. The reason they succeed so well in Colorado is perhaps on account of the cooler temperature, and, it may be, the unsuitability of dry air to the development and propagation of fungous diseases of all kinds. Grapes seem to have no



NONIRRIGATED ORCHARD OF APPLE AND PEAR TREES (4 YEARS OLD), NEAR LITTLETON, EASTERN COLORADO.

black-rot or mildew in this State, perhaps for the same reason. There is neither scab (*Fusicladium*) nor the dark fungous-blotches so common to the apple and pear in the Eastern States. Instead, there is a most delicate, waxy exterior, and in many varieties a beautiful bloom on the apple which but faintly develops in any other State, and nowhere else to such an extent. The coloring of these apples is exceedingly delicate, and yet quite intense and often brilliant. To those who have never seen fruit from this region, it would at first seem too exquisitely colored to be natural. In size, the winter apples and pears of eastern Colorado are rather below the average because of the short season, but the early varieties are as large as they grow elsewhere. Berries of all kinds are fully up to the average, and blackberries which I saw the last week in August were as large as those produced in the height of the season. Doubtless irrigation is the cause of their large growth so late in the season. As to the very important matter of flavor, I took special pains to observe, and found that, except in case of excessive irrigation, it was equal to that of any fruit found elsewhere.

One serious disease noticed was fire-blight on the apple, pear, and quince trees. It seemed very prevalent about Denver, and especially where irrigation had been excessive, as this caused a rank growth, upon which the disease preyed with avidity. In some cases whole rows of pear trees had been destroyed. Transcendent crab apple was rarely exempt. Throughout the eastern part of the State insect enemies of various kinds, especially the codling moth in the apple and pear, have been annoying the fruit-grower. Spraying with arsenical preparations has proved effective in preventing their ravages. Every progressive orchardist uses these remedies with as much punctuality as he does his cultivators. One species of leaf-roller was very destructive to many kinds of fruits by destroying the foliage. About Denver there was also serious defoliation by a kind of grasshopper, which attacks not only many kinds of fruits, but vegetables and field crops. In point of fruitfulness there could be no complaint. The trees of all kinds were loaded with fruit. Owing to a general failure of the apple crop throughout the country, prices ranged high.

It might be well to state that in eastern Colorado the peach is not successfully grown, because of the tenderness of the tree. Some varieties of the apple have also proved tender, and many of the Russian kinds have been grown in the hope of finding some that might be hardy and valuable, at least for market purposes; but their almost uniformly poor quality and susceptibility to blight has proven that they are not very satisfactory.

It would be an oversight, indeed, were I to omit mention of the orchard of Stark Brothers, near Littleton, which is 8 miles south of Denver. There are 93 acres, all ordinary upland, and it is neither flat nor hilly, but generally sloping in several directions, principally to the northwest. It was planted four years ago to apple, pear, plum, and cherry. In all, there are over 12,000 trees. The remarkable thing is that there has been no irrigation in this orchard except a very little the first year, and the trees have made a fairly vigorous growth every year. I found on many of the trees a sufficiently heavy crop of fruit for trees so young, and although it was not so large as if irrigation had been practiced, it was by no means poor. There had been no rain of any consequence for several months, and yet the trees showed no signs of drought. Plate II is made from a photograph taken in this orchard, showing apple and pear trees alternately in the same row. Just across the fence was the wild prairie, which looked like a desert, as it was almost devoid of

anything like life. The ground was not naturally subirrigated, for a ditch more than 10 feet deep, in which to lay a Denver City water main, was then being dug along one side of the orchard; it plainly showed no signs of seepage from the land on which the orchard stood. The whole secret of success lay in frequent but shallow cultivation.

I was told by the foreman of the farm that the whole orchard had been cultivated once a week since last spring. This was the regular order during the growing season unless the ground was too wet. The tools used are such as stir thoroughly, but not more than 3 or 4 inches deep. The Clark disk harrow, and another something like the Acme, but with a heavy slab-drag attachment, which at once presses and smooths the finely pulverized surface, are preferred. The smooth surface presents as little of the moist earth as possible to the evaporating influences of the sun and wind. Aside from suppressing a growth of weeds, the express purpose is to keep in the earth the moisture which is deposited by the rains. With only about one-eighth as much rainfall as is common in a large part of our country, scarcely a tree would have survived any of the four years they have stood, except for the cultivation. It prevents evaporation in much the same manner that a blanket preserves a chunk of ice. Accurate scientific experiments made at the State Experiment Station at Champaign, Ill., proved that an average tree extracted from the soil and dissipated into the air about 5 inches (in depth) of water in the course of one summer, and the Stark orchard seems to corroborate this theory on a large scale, and that, too, where the rarer air and the generally more intense evaporating influences prevail than at Champaign, Ill. The thin mulch of finely pulverized soil acts as a nonconducting stratum between the moist subsoil and the dry atmosphere.

One would be very dull who would not reasonably conclude that, if this orchard has been safely brought through the trying summers of Colorado with only a very scanty supply of moisture from the clouds, an Eastern cultivator need have no fear from the short droughts he is likely to experience. If he will keep shallow but wide cultivators going, he will not only keep down weeds by nipping them in the bud, and at a small expense, but he may defy any ordinary dry spell. Of course this method can be properly tested only where the soil is either naturally or artificially thoroughly underdrained. Especially after every rain should harrowing be done as soon as the ground can be worked. This one lesson in practical horticulture, if heeded, will be worth millions to the country. The Eastern horticulturist has much to learn from the experience of his Western collaborer. In California a modified form of the plan just described is practiced in the nonirrigated orchards and vineyards, and in a former report I mentioned the almost weedless orchards stretching out for miles and miles, which I was delighted to see there. If those who cultivate in other sections would practice the same doctrine, we would hear of fewer failures and immensely better crops. The fact is, we do not more than half cultivate our orchards, vineyards, and berry patches. Let there be a general reform.

From the eastern border counties I passed through Pueblo up the Arkansas River to Canon City and vicinity. This is on the edge of the mountains, and at an elevation of 5,400 feet above sea level. The general character of the soil is fine silt, which, in the lower lands along the river, is termed "adobe" (a-do'-by). The higher tables or mesa lands are more inclined to be sandy and gravelly, and seem to be better for fruits, provided water can be conveyed to them in ditches. Here I

found an almost total failure of all kinds of fruits, owing to an unusually severe and untimely spring frost. A thorough survey of the fruit farms plainly showed that nearly all the standard fruits do well here, except the peach and the apricot. One orchard of 10 acres, that was planted very closely, had, within ten years from setting, yielded a gross income of over \$17,000, and by a judicious cutting out of a part of the trees I believe it may yield as much more fruit in the next ten years. No blight was seen on any of the trees in that section, but insects were there, especially the codling-moth. The Rocky Mountains are at hand, and the river has here cut through a range forming the "Royal Gorge," which is some 3,000 feet deep. Passing through this on the railroad, and nearly 60 miles of desolate mountain region, a valley about 5 miles wide and 20 miles long is reached. In this is Salida, a thriving town, supported chiefly by the railroad and mining interests. The soil here is principally composed of rotten granite with a rather generous mixture of gravel. Very little is being done in regard to fruit culture. I think this is principally owing to neglect. One apple orchard visited, which is about 7,100 feet above sea level, was well loaded with fruit. It was under average size, but the color was very brilliant and the flavor was very good. No injurious insects or traces of their work were seen after a close investigation. Apples, pears, and a few of the hardier plums seemed hardy and productive. Small fruits flourished wherever reasonable care had been given. That fruits can be grown at so high an altitude is, indeed, encouraging to those who, for any reason, find it desirable to make their homes there, for they may not only find enjoyment but profit in seeing them grow; besides, they can have them fresh, which, as every one knows, is very desirable.

The next place of investigation was across the Continental Divide, at Montrose, where the elevation is 5,800 feet. This is the first settlement of importance where fruits are grown in the valley of the Uncompahgre, which is one of the tributaries of the Gunnison River. The lower valley lands are adobe, and in some places are saturated with alkali to such an extent as to be objectionable. The mesa lands, which are from 50 to 100 feet or more higher, are extremely well adapted to all kinds of deciduous fruits. Although but a short time was spent at this point, several orchards were carefully examined and found thrifty and productive. With the exception of codling-moth in apples and pears in some of the town lots not an insect or fungous disease was noticed.

Delta, which is near the junction of the Uncompahgre and Gunnison rivers, was next reached. The altitude is about 5,000 feet, and the character of the soil is much the same as about Montrose. The fruit interest here is beginning to override all others, and orchards are being planted in every direction. The table-lands or mesas, which are some 50 feet above the level plains next the rivers, are entirely free from alkaline properties and seem to be best for fruit. The peach, apricot, and all the deciduous fruits were bearing profusely. No insect enemies were seen or heard of in this vicinity.

A few miles up the Gunnison River from Delta is the mouth of the North Fork, which stream runs through a valley about 25 miles long and less than half as wide. This valley is really shut in on all sides either by high mountain ranges or rough barren areas which makes it a veritable oasis. The soil is remarkably fertile on the lower lands as well as on the mesas, and there is almost no alkali in either. Fruits do as well as anywhere in western Colorado, and there was not a sign of insect or fungous enemies. In the numerous orchards visited, not a sting or diseased leaf could be found. Apricots and plums were gath-

ered from the ground and eaten without fear of being wormy. Apple, peach, and pear trees hung loaded with fruit, to a degree dangerous to the trees, and I was told by all persons questioned that a failure is so far unknown. Plate III represents a tree of Wagener apple, 6 years old, in the orchard of W. S. Coburn, near Paonia, which I photographed during my visit. It was truly representative of what was seen in many other orchards in the same vicinity. In all my travels I have not seen a more profitable and delightful place to grow fruit than the North Fork of the Gunnison River. Two notable features of this particular valley are the abundant supply of water in the river for irrigation, and its freedom from alkaline or other impurities. If ditches were built to conduct water to every acre of arable land in the valley, there would yet be a good supply in the stream, even at its lowest stage. The water is as clear and cold as if it came directly from a spring, and I venture the assertion that there is no purer water in any river in the country.

Returning to Delta I followed down the Gunnison River to Grand Junction, which is near the confluence of the Gunnison and Grand rivers. These being united form the Colorado, which, not far below, enters the Grand Canon. Utah is but 17 miles to the westward. The soil and general character of the country are similar to that about Delta, but the altitude is about 400 feet lower, or 4,600 feet. There are some very thrifty orchards in the lower adobe lands, but tree-planting is being much more rapidly pushed on the table-lands whenever water for irrigation is available. There are large tracts yet owned by the Government that might become equally as valuable as any now under cultivation. Turning eastward at this point I pushed my way for more than 50 miles up the Grand River, through a series of valleys similar to those mentioned, and saw abundant evidence that fruits of the choicest qualities are being grown. It has been but eleven years since the Ute Indians took down their "wick-a-ups" and moved their squaws, papooses, ponies, and dogs from these fertile valleys of western Colorado. Now there is every evidence of advanced civilization and prosperity. While stock-raising is one of the leading industries, fruit-growing is found much more profitable, and large commercial orchards are already planted. The nearness to the mines makes the price of fruit high, for, owing to the climate of those higher regions, the inhabitants must be large consumers of fruit. Hand-picked apples were selling in the orchard at 5 cents per pound, and windfalls at 3 cents, with other fruit in proportion. A most serious evil which threatens many sections of Colorado is the spread of noxious insects. Too much care can not be exercised to prevent their introduction, nor too stringent means adopted by the State for their suppression where they already exist. The whole of the region west of the mountain passes is practically exempt from them so far, except that in the town of Montrose and on one farm near Colorow the codling-moth has a foothold. If prompt action be taken by passing a law and enforcing it, as in some other States, or if the fruit-growers will organize and purchase and destroy all wormy or even suspected fruit, this insect will soon disappear. A saving of many thousands or even millions of dollars may thus be made at a very small expense by promptly carrying into effect some such plan.

A serious mistake made by some fruit-growers is in excessive irrigation and a corresponding lack of stirring of the soil. They try to make up with water what they fail to do with the plow and cultivator, but the effects are weedy orchards, fruits of poor quality, and diseased roots. The latter often seriously affect the life of the tree or plant. If the soil be kept moist, loose, and free from weeds, it is in the best possible condition



WAGENER APPLE TREE (6 YEARS OLD), NEAR PAONIA, WESTERN COLORADO. (IRRIGATED.)

for the production of good fruit, and the less irrigation that is necessary the better. The more successful growers have come to this decision.

Overfruitfulness is the rule, and so is early bearing. Many varieties of apple that bear too sparingly in the Eastern States are entirely free from this fault in Colorado. As proof of this I saw trees of Grimes Golden, Summer Pearmain, and Northern Spy, less than eight years set, that were bearing freely. Yellow Transparent, which is an early bearer everywhere, is so loaded in Colorado at two or three years after being set as to need vigorous thinning to save the trees. Contrary to what might be expected in the warmer valleys of Colorado, winter apples produced there keep very well, and, judging by those seen, I think they are in season with the apples of Ohio.

Among the disadvantages of fruit-growing in Colorado are the high prices of land in some sections and the cost of water for irrigation; but, all things considered, there is perhaps no State that offers greater inducements to the energetic and industrious, whether possessed of large or small means.

SEEDS, PLANTS, AND SCIONS DISTRIBUTED.

Such importations of fruit-tree seeds, plants, and scions as could be made at small expense have been secured and placed with experiment stations and private individuals for testing. A number of seedling fruit trees, plants, and scions have been sent to the division by the originators for distribution, and all such contributions have been distributed to experimenters located in the various parts of the country where they are likely to succeed and become valuable.

CHESTNUT.

From Sicily there was obtained, through the kindness of Hon. Charles Heath, United States consul at Catania, 1 bushel of fresh Italian chestnuts grown on the slopes of Mount Etna, and regarded as one of their most valuable nuts. These were sent to about 150 correspondents for planting.

KAKI.

Two varieties, Mestio and Kako, were received from Prof. Kizo Tamari, Imperial College of Agriculture, Komaba, Tokio, Japan. These were trees grafted under Prof. Tamari's directions from what he considers the best varieties in the coldest region where the kaki is grown. The trees have been placed in Florida for propagation, and are reported to have made a fine growth during the summer. Some time must elapse before they can be widely distributed, however, owing to the fact that of one variety but a single tree, and of the other, but two trees, could be had. Scions of another variety sent without name from Korea by H. N. Allen, an American residing there, were also received and placed with propagators. Mr. Allen reports this variety as growing well in that cold climate, and thinks it probable that it will succeed in the region of our Great Lakes.

Scions of eight of the leading varieties now growing in this country, the nomenclature of which may now be considered to be fairly settled, were sent to a number of the experiment stations and leading nurserymen of the South to afford means of comparison, to determine the identity of the varieties they may be growing, and to aid in the work of getting at the relative merits of each.

ORANGE.

There being some doubt as to whether the true Selecta orange of Brazil has been introduced into this country, an importation of five trees of this variety was secured through the consul general of the United States at Rio Janeiro. These were placed in Florida, Louisiana, Arizona, and California to give the variety a wide test, and to determine its value as soon as practicable.

MISCELLANEOUS.

Scions of five varieties of apple were distributed. Also vines and cuttings of eighteen varieties of grapes, one of currants; scions of two varieties of quince, one of American chestnut, five of hickory, three of pecan, two of hazel, one of native persimmon, eight of plum, and three varieties of strawberry plants. Of fruit seeds there were secured and distributed some eight species. Altogether about four hundred lots were sent out during the year.

PROMISING NEW FRUITS.

Brief descriptions of some of the most promising new fruits received during the year are noted below, for the benefit of planters and experimenters.

APPLES.

Brightwater (G. F. Kennan & Son, Rogers, Ark.).—Large, round conical with a greenish yellow surface somewhat mottled with russet, and heavily splashed, striped, and shaded with dull red; dots minute, yellow and brown; skin thick; flesh greenish yellow, fine-grained, juicy; core large, conical, closed, clasping; calyx tube very long; seeds few, large, pointed, brown; flavor subacid, quality good; season winter. Said by Mr. Kennan to be a moderate bearer until it reaches the age of 12 or 15 years, after which it is productive. Tree resembles Limbertwig, but is coarser in growth. It is hardy in Arkansas.

Bryant (G. W. Bryant, Vienna, Va.).—Fruit large, roundish oblate, smooth; color greenish yellow shaded and splashed with dull red, striped with darker red and covered with gray over color; dots numerous, large, gray russet, many of them being aureole, or with prominent rough centers. Flesh yellow, coarse-grained, tender, juicy; core conical, closed, clasping; seeds plump, medium sized, brown; flavor mild subacid; quality very good. Season late winter to spring in Virginia. Very promising as a long keeper for the apple regions of the South.

(J. G. Brown, Wyoming, Del.).—Fruit large, roundish oblate; surface smooth, greenish yellow, shaded and striped with red and overspread with gray at the base; cavity large, regular russeted; dots numerous, large, gray; stems short or medium, slender; basin medium, regular, folded; calyx segments short, broad, slightly reflex; eye large, open; skin thick; flesh greenish yellow, fine grained, breaking; core wide conical, closed, clasping; seeds plump, large, brown; flavor mild subacid; quality very good. Season, late winter and spring in Maryland and Delaware. This apple originated on the farm of Thomas Jackson in Kent County, Del. Mr. Brown describes the tree as a poor grower, weeping badly, and thus showing most of the fruit on the limbs.

Jacob (Henry G. Schantz, Zionsville, Pa.).—Fruit large, globular oblate; surface smooth, yellow, striped and splashed with crimson; dots few, gray; cavity regular deep, abrupt, green; stem short, slender; basin regular, deep, abrupt folded; calyx segments curled or twisted; eye small, closed; flesh yellowish white, slightly tinged with red, fine-grained, tender, juicy; core wide, open, clasping; seeds plump, pointed, brown; flavor mild subacid, spicy; quality good. Season, late winter in Pennsylvania. The original tree is a vigorous grower, forming a large, round-headed, half spreading orchard tree. It is a good bearer, though more than a hundred years old.

Mickel No. 1. (A. D. Barnes, Waupaca, Wis.).—Large, oblate; surface smooth, glossy, greenish white, striped with light red; dots few, white; cavity large, very deep, slightly russeted; stem short, slender; basin medium, deep, abrupt, folded;

segments wide, short, converging; eye small, closed; flesh white, fine-grained, tender, juicy; core wide, conical, clasping, nearly closed; seeds plump, medium, brown; flavor slightly subacid; quality good. Season, last of September in Wisconsin.

Perry (Edward W. Perry, Lattas, Ohio).—A fruit of medium size, oblate, regular; surface smooth except for numerous large russet dots; color yellow, striped and shaded with bright red; cavity large, deep, russet; stem short, medium; basin regular, medium, folded; calyx segments short, slightly reflexed; eye small, closed; flesh yellow, fine-grained, tender, juicy; core wide, closed, clasping; seeds large, brown, plump; flavor mild subacid; quality very good. Season, late spring in Ohio. A good bearer and long keeper.

Story (D. B. Story, Hemlock Grove, Ohio).—Size above medium, roundish conical; surface smooth, light red shaded and splashed with dark red and overshadowed with gray; dots few, minute; cavity medium, russetted; stem short, fleshy at base; basin irregular, large, abrupt, folded; calyx segments short, broad, reflexed; skin thick, tough; flesh greenish yellow, fine-grained, melting; core large, open, conical, clasping; seeds numerous, plump, large, dark brown; flavor sweet; quality good to very good. Season, late winter in Ohio. A very promising long keeping, red, sweet, winter apple. This variety was found by Mr. Story in a neighbor's orchard planted about 1845. There is but the one tree and it is thrifty, bearing annual crops. The source from which the trees were obtained is unknown by the man who aided in planting the orchard, and it is apparently a seedling.

Upp (Henry W. Hope, Paint, Ohio).—Medium in size, oblate conical; surface smooth except for a few russet knobs, yellowish green, mostly covered with red; dots few, conspicuous and prominent at base, small toward apex; cavity large, russetted; stem very short; basin medium folded, ribbed; eye medium, closed; flesh yellowish, moderately tender; core medium, nearly closed, conical; flavor mild subacid; quality good. Season, August to January in Ohio.

RUSSIAN APPLES.

White Russet, No. 981 (Dr. T. H. Hoskins, Newport, Vt.).—Large, roundish, truncated; surface smooth, oily, pitted; greenish white shading into yellow, with a faint blush; dots green or red; flesh white, fine grained, juicy; core large, wide, conical, clasping, nearly open; flavor brisk subacid; quality good. Season, early winter in northern Vermont.

Cross No. 15 M. (Prof. J. L. Budd, Ames, Iowa).—Fruit medium, roundish, oblate, regular; surface smooth, pale green with slight traces of russet near base and raised russet dots; cavity medium, russetted; stem medium; basin medium, ribbed and knobbed; eye small; flesh greenish white, firm but tender; core oblate, somewhat open, meeting the eye; seeds long, plump, below medium in size, reddish brown; flavor rather acid; quality good. Season, winter in Iowa. These two varieties may be classed as Russians of good quality that keep fairly well. The name "Cross," which is a translation from the Russian, unfortunately conflicts with that of a variety long grown in Maryland and Virginia under the same name, and mentioned in my report last year.

CRAB APPLE.

Snyder (A. L. Hatch, Ithaca, Wis.).—Fruit large, oblate conical, smooth, yellow, splashed and striped with bright carmine and overcolored with gray toward the base; dots medium to large, indented, yellow; cavity regular, medium, deep, russetted; stem short, slender; basin shallow, finely plaited; calyx segments wide, medium length, reflexed; eye small, closed, flesh yellowish, medium, fine-grained, juicy; core large, closed, clasping, conical; seeds plump, short, small, brown, few; flavor mild subacid, sprightly; quality very good. Season, September in Wisconsin.

PEAR.

Fitzwater (Herbert A. Jones, Himrods, N. Y.).—Small, obovate, obtuse pyriform; surface smooth, yellow, with splashes and patches of russet; stem 1 inch in length, slender, with bracts, set in a regular cavity of medium size and depth, lined with russet; basin regular, large, medium depth, russetted; calyx segments rather long, spreading, connected at base; eye medium, open; dots numerous, small, brown; flesh yellowish white, fine-grained, juicy, buttery; core medium size, oval, closed, clasping; seeds mostly imperfect, dark brown; flavor mild, sweet, aromatic; quality good. Season, winter. This pear very closely resembles Lawrence, but is claimed by the introducer to be distinct.

Longworth (M. J. Graham, Adel, Iowa).—Above medium size, moderately smooth; greenish yellow with a delicate blush on the sunny side and a few patches of russet;

dots numerous, brown; flesh whitish, medium fine-grained, dry; flavor sweet; quality medium. Season, September in Iowa. Originated with William Longworth, of Dubuque. Tree stands and bears well up to the north line of the State. It is not only hardy but resists blight. Valuable for the northwest, where most varieties winter-kill.

Max (L. M. Ayers, Urbana, Ohio).—Fruit medium size, obovate pyriform, regular; surface smooth, lustrous, yellowish green with bright blush in the sun; dots numerous, small, depressed, russet; flesh white; flavor, vinous, almost subacid; quality, fairly good. Season, September in Ohio. A seedling from Flemish Beauty, crossed with Louise Bonne.

Mission (J. B. Mathews, Capistrano, Cal.).—Fruit irregular acute pyriform; yellow, thinly covered with russet and a tinge of brownish red in the sun; dots numerous, light brown, some quite large; stem medium, stout, set on obliquely with a lip; basin regular, medium size, folded; calyx segments medium, stiff, variable, some erect, others recurved; eye small, closed; flesh white, fine-grained, buttery; core regular, small, nearly closed, meeting the eye; seeds few, large, very dark brown; flavor very mild, almost sweet; quality good. Valuable for cooking and preserving. Season, September and October. The original tree is near the Mission at Capistrano, and is supposed to have been grown from seed by the priests. It has been somewhat propagated by means of suckers. Tree is about 100 years old, 39 inches in diameter, at 4 feet from the ground; is 60 feet high, and produces annually about 1,200 pounds of fruit.

Victor (Stark Bros., Louisiana, Mo.).—Fruit large, pyriform; surface very smooth; color greenish yellow with a slight blush; dots numerous, small; flesh yellowish; core long, oval, closed, meeting the eye; seeds angular, small, brown; flavor very mild, almost sweet; quality good. Season, September. The tree is a very poor grower in nursery, but is said to make a healthy orchard tree, little affected by blight. This pear was brought from Pennsylvania by Judge Samuel Miller. It was there known locally as "Vicker," but to avoid confusion with the well-known Vicar (of Winkfield) it has been renamed "Victor."

CHERRY.

Bing (Plate iv, a—Seth Lewelling, Milwaukee, Oregon).—Fruit very large, broad heart-shaped, compressed, slightly angular; surface bright, glossy; color very dark crimson to black; dots numerous, often elongated; cavity broad, stem long, suture very broad, apex slightly depressed; skin thick, very firm, but not tough; flesh deep crimson, very firm, juicy; flavor vinous, sweet; quality very good. Season, first half of July in Oregon. This is the largest cherry ever received at this office. It is an excellent shipper. A seedling of Black Republican. For comparison with Bing, on Plate iv, b, will be found an illustration of Napoleon, a popular old variety of European origin, which is widely grown in California and Oregon, sometimes under the synonym "Royal Ann." It is too well known to fruit-growers everywhere to need a detailed description.

Hoskins (C. E. Hoskins, Newberg, Oregon).—Fruit large, roundish, heart shaped; cavity round, regular; suture a mere line; stem rather short, set in a regular round cavity of medium depth; color dull purplish red; dots elongated; skin medium; flesh purple, with light veins, firm; flavor sprightly, sweet; quality good. Season, medium. An excellent shipping cherry in Oregon. The tree is a somewhat spreading, upright grower, very vigorous, with large coarsely dentate ovate leaves having two large reniform glands.

Matilda (C. E. Hoskins, Newberg, Oregon).—Fruit medium to large, broad heart shaped; surface smooth, glossy, dark red, nearly black; dots very fine; flesh liver color, firm; flavor sprightly, sweet; quality very good. Another promising market sort. Season, middle of June in Oregon.

Mercer (Plate v—Joseph H. Black, Son & Co., Hightstown, N. J.).—A medium sized, irregular, heart shaped cherry; cavity round, wide, irregular; stem medium length, rather slender; surface irregular, angular, glossy, bright red, with darker mottlings and blotches; dots minute, depressed; skin rather thin, moderately tough; flesh pinkish, meaty; flavor subacid, lively, rich; quality very good. Season, middle of June in New Jersey. Fruits in clusters of two or three. A very productive variety. Tree a vigorous grower, hardy in New Jersey. Original tree is said to bear 10 to 18 bushels per year.

Quaker (C. E. Hoskins, Newberg, Oregon).—Another of Mr. Hoskins' seedlings, and of most excellent quality. Fruit medium size, dark red, almost black, dots numerous; flesh firm, dark purple; flavor sprightly, sweet; quality very good. Season, early in July in Oregon.

Vesta (C. E. Hoskins, Newberg, Oregon).—Fruit medium size, blunt heart shaped, very dark; flesh firm, sweet, good. Season early, middle of June in Oregon.





Wm H. Prestele, Tint.

R. Hoe & Co., Lithoartists

MERCER CHERRY



PEACH.

Guadalupe (G. Onderdonk, Nursery, Tex.).—One of the Spanish class. Glands reniform. Fruit roundish oblate, conical, of medium size, with a prominent tip and deep suture; surface rather harsh because of the short persistent down; color dull creamy white; skin thick, tough; flesh white, faintly tinged with red; clings to the stone; flavor vinous aromatic; quality very good. Season late, ripening in August in southern Texas.

Oro (C. S. Bell, Oroville, Cal.).—Large, oblate conical, yellow-fleshed free stone; surface smooth, reddish yellow with bright red blotches where exposed to the sun; skin thin, tender; flesh reddish yellow, melting, juicy; flavor vinous, almost subacid, like Crawford. Season late; last of September at Oroville. Glands reniform.

Rose (G. Onderdonk, Nursery, Tex.).—"The earliest of the Spanish race." Medium size, round conical; surface smooth, dark red; skin thick; flesh greenish white, melting, juicy; flavor sprightly, vinous; quality good. Likely to be of value on account of its earliness as compared with most of its type.

Stinson Late (H. E. McKay, Madison Station, Miss.).—Fruit large, broad oval; surface soft, velvety; color creamy white, shaded on sunny side with dark purple; skin thin, tough; flesh white, veined with red, quite red at the stone, to which it adheres; flavor mild, subacid; quality good. Season late; first half of October in central Mississippi.

Zane (Joseph Morrison, Cadiz, Ohio).—Fruit medium size, roundish oblate, with a deep cavity and very shallow suture, except at apex, which is deeply depressed; surface soft, velvety, yellow, shaded with bright red and a dark purple cheek in the sun; down short, adherent; skin thin, but tenacious; flesh yellow, red next the stone, free, melting, juicy, mild subacid, good. Season, first half of September in eastern Ohio. The original tree is a sprout below the bud in a garden on Wheeling Island in the Ohio River. It is nine years old, and bore this year eight bushels of peaches, other varieties having but little fruit. The tree is a strong grower, leaves have small globose glands. It somewhat resembles the Crosby described in my report for last year, but is evidently distinct from that variety.

PLUM.

Grace (W. R. Grace, Garden City, Kans.).—Fruit above medium size, oblong; surface smooth, glossy, yellow, striped with red, and mottled and washed with dull purple; dots numerous, light yellow; bloom light, thin; skin thick, not bitter; flesh yellow, translucent, melting, juicy, with very little pulp, clinging to the oval stone; flavor rich, sweet, vinous; quality very good. A delicious plum, apparently of the *Americana* type. Season, September in Kansas.

Golden (Luther Burbank, Santa Rosa, Cal.).—Fruit large, round oblate, smooth, yellow, washed and shaded with light red and a few patches of russet; dots numerous, yellow; flesh golden yellow, with white fibrous veins; flavor rich, sweet; quality very good. Season, beginning of September at Santa Rosa. A seedling of Kelsey fertilized by Burbank.

Harlow (S. C. Harlow, Bangor, Me.).—Fruit large, oblong oval, smooth, glistening; color red to dark purple; dots numerous, small, fawn color; bloom light blue; flesh greenish amber, melting, somewhat fibrous; flavor mild subacid, skin slightly bitter. Season early, beginning of September in Maine. Quite like Bradshaw, of which it is supposed to be a seedling, but ripens a week or ten days earlier. Tree reported to be a vigorous grower, hardy at Bangor, and exceedingly productive.

Jessie (Martin Nursery Co., Winfield, Kans.).—This plum is a wild seedling of the *Americana* type. Fruit large, ovate or ovate-compressed; surface waxy; color wine red with small or numerous dots; flesh reddish yellow, melting, somewhat stringy; flavor slightly subacid, almost sweet when ripe; quality very good. Said to be very productive. Season, last of July and first of August in Kansas. The tree is said to be vigorous and healthy, though with a tendency to sucker badly. This is overcome by grafting it on other stocks. It has stood a temperature of 16 degrees below zero without being injured.

Perfection (Luther Burbank, Santa Rosa, Cal.).—A seedling of Kelsey crossed by Burbank. Fruit above medium size, heart shaped; red, shading into very dark red at apex, with numerous light dots; quality very good. Season, August at Santa Rosa. Mr. Burbank reports the tree to be a strong, stocky, upright grower and very productive. He regards it as combining all the best qualities of the parents.

Sophie (Plate VI—J. W. Kerr, Denton, Md.).—This is a novelty among our new plums, being the result of a supposed cross of German Prune on Wild Goose. Fruit of medium size, varying in form from ovate to oblique obovate; surface smooth, glossy, under a whitish bloom; color dark amber red, modified by numerous small light dots; skin thick, tough, quite tart, slightly acerb; flesh orange yellow, firm yet melting; flavor vinous, sprightly; quality good. A promising sort for market,

being a much better shipper than Wild Goose. Season, first half of September in eastern Maryland.

Theresa (Mrs. Theresa M. Morris, Bloomingburg, Ohio).—Fruit medium size, roundish oval; color reddish purple, covered with a heavy light blue bloom; flesh yellowish green; flavor very mild, rather sweet when fully ripe; quality only good. The tree is a heavy and regular bearer, hardy in Ohio, hence may be valuable in some sections where other varieties fail because of tenderness or lack of productivity. Season, beginning of August in Ohio.

GRAPE.

Critic (J. S. Breece, Fayetteville, N. C.).—A seedling of Jefferson much resembling Delaware in appearance and ripening earlier than Brighton; quality hardly equal to Delaware. The vine has proved freer from mildew than Delaware and is promising as a market grape.

Hosford (George Hosford, Ionia, Mich.).—A large grape of the Labrusca type a few days earlier than Concord. The cluster is very large, slightly shouldered, tapering; berry very large, spherical, smooth, black, with rather thin bloom; skin rather thin, tender; pulp clear, tender, juicy; seeds few and small; flavor sweet, pure, brisk, not foxy; quality good.

Lawrence (Dr. R. B. Clark, Fay, Pa.).—Cluster large, long, tapering, slightly shouldered; berry medium to large, round, adhering well to cluster; color dark purple to black with thin bloom; skin medium in thickness; pulp very firm, breaking; seeds few, flavor vinous, subacid, not equal to Concord. Season, medium to late. This grape vine is said to have been found growing in a fence corner some twelve years ago, and transplanted to a garden. It began to bear early and has been fruitful every year and free from mildew and black rot.

Ohio (E. H. Cushman, Euclid, Ohio).—Originated with R. H. Hunt, of Euclid. Cluster large, tapering, slightly shouldered; berry rather large, round, black with slight bloom; skin rather thick, tender; pulp moderately juicy, tender; seeds small, three or four in number; flavor mild, slightly subacid; quality medium. Season early.

BLACKBERRY.

Eldorado (E. M. Buechly, Greenville, Ohio).—This berry was noticed last year and it seems to be of so much promise as a dessert fruit that an illustration of it is presented on Plate VII. It is an oblong, irregular berry of large size, fruiting in pendulous, slender, hairy spikes, with few thorns. Color brownish black; flesh deep crimson with tender core; flavor sweet, rich; quality very good.

Prinus (Plate VIII—Luther Burbank, Santa Rosa, Cal.).—This berry is the result of a cross between a Siberian raspberry (*Rubus crataegifolius*) and the Pacific coast dewberry (*Rubus ursinus*). It is classed with the blackberries because it most resembles them in appearance, and the fruit generally adheres to the receptacle, like the blackberries. The fruit is large, long, blunt, conical or oval, composed of drupes of medium size, containing rather large, curved, flat seeds, firmly attached to a tender core; juicy, subacid, aromatic, resembling the raspberry in flavor. Season varies from latter part of April to May, at Santa Rosa, about with Hansell raspberry. The plant is a strong vigorous grower, having in part the trailing habit of the pistillate parent; is thickly covered with short blunt prickles and requires tying up. It is very productive. It is somewhat harder to propagate than other blackberries or raspberries, but can be grown by rooting tips as in the black raspberry. It does not start readily from root cuttings. It is illustrated as a promising new fruit, one result of the careful and extended experiments made by Mr. Burbank in crossing and hybridizing to produce new varieties and types of commercial value. Enough has already been accomplished in this line by him and others to warrant the prediction that we are soon to witness a marked addition to the variety and quality of our cultivated fruits.

Truman Thornless (G. P. Peffer, Pewaukee, Wis.).—A medium to large oval berry with dull color, firm, sweet, fragrant; quality good. Said by Mr. Peffer to have come from New England. As hardy as Snyder, earlier, and of a better quality. It is nearly thornless.

GOOSEBERRY.

Columbus (Ellwanger & Barry, Rochester, N. Y.).—A very large berry of the English type. Single specimens were 1 $\frac{1}{2}$ by 1 inch in size. Form roundish oblong to obovate; color greenish yellow, transparent; flavor subacid; very good. A promising garden variety.





With H. F. Knobell, F.C.A.

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PRIMUS, HYBRID BETWEEN RUBUS URGINUS AND R. CRATAEGIFOLIUS.





Red Jacket (George S. Josselyn, Fredonia, N. Y.).—Fruit large, roundish or elongated; color reddish green, shading into solid red, quite transparent until fully ripe; skin rather tender; flesh light red, fine, pulpy, juicy, rich, fragrant; quality very good.

RASPBERRY (BLACK).

Babbitt (W. R. Laughlin, College Springs, Iowa).—A black cap of medium size specially commended for hardiness. Round, oblate, with drupes small and rather numerous, dull black, without bloom; moderately firm, juicy, subacid quality good. On plants of same age it this year yielded 50 per cent more than Hopkins. A strong vigorous grower, with a long ripening season.

Hannibal (Plate IX—W. J. Bradt, North Hannibal, N. Y.).—This berry was mentioned in the report for last year as "Extra Late." At our suggestion it has been named Hannibal. As the plate shows, it is a very large round black cap, with drupes rather regular and numerous. It is a fine berry of excellent quality, apparently vigorous and productive. Its chief value is in its late season of ripening, being several days later than Gregg.

RASPBERRY (PURPLE).

Colossal (I. F. Street, West Middleton, Ind.).—A seedling of Shaffer, very closely resembling its parent.

RASPBERRY (RED).

Cardinal (A. H. Griesa, Lawrence, Kans.).—A late red berry of medium size, very productive, and with a long ripening season.

King (Cleveland Nursery Co., Rio Vista, Va.).—Round, medium size, light crimson color; drupes large, few, with suture very plainly marked; moderately firm, juicy; flavor subacid; quality good. A seedling of Thompson ripening at about the same time, but larger and more productive.

Royal Church (Plate x—Royal Church, Harrisonville, Ohio).—This berry, mentioned last year, continues to promise well notwithstanding the unfavorable season in Ohio. It is a roundish crimson berry with large drupes, moderately firm and of excellent quality. The plant is a vigorous grower and is reported to be hardy in Ohio and New York.

STRAWBERRY.

California (H. T. Curtiss, Ridgely, Md.).—Large, long conical, sometimes compressed and coxcombed; calyx large, stem stout; color very deep crimson, glossy, with seeds little depressed; flesh bright crimson, firm, juicy; flavor subacid, pleasant; quality good. A valuable market berry for strong lands and narrow row culture. It was at one time thought to be Belmont, but is now regarded as distinct. It is a good pollinator, blooming with Crescent.

Columbian (R. H. C. Mitchell, Fruitland, Tenn.).—A new berry from Tennessee, claimed to be earlier than Crystal City, and valuable as a market berry. The specimens received were large, broad conical, rather irregular berries of a light crimson color with seeds slightly depressed. Calyx medium size, smooth, bright green; stem stout; texture rather soft, about like Crescent; flavor subacid, pleasant.

Murray [Imperfect] (J. S. Westbrook, Faison, N. C.).—A North Carolina berry valued for its earliness and productiveness. A medium to large, broad conical berry, often compressed or double at the top. Size medium to large; light crimson; firm; rather sharp acid; quality medium; a good shipper.

Omega [Imperfect] (John Willcox, Bridgeton, N. J.).—Blunt conical, medium to large, with a deeply depressed calyx; slightly irregular, light crimson; flesh scarlet, moderately firm. Of fair quality. It is worth testing as a late berry.

TROPICAL AND SEMI-TROPICAL FRUITS.

KAKI.

Costata (Plate xr—G. L. Taber, Glen St. Mary, Fla.).—Medium size, conical, slightly four-sided, calyx considerably depressed and basal markings quite distinct; surface smooth, salmon yellow, rarely cracked; flesh yellow, with few seeds, astringent till ripe; late and keeps well. The tree is a strong upright grower, very distinct in form, with broad roundish leaves, making it also valuable as an ornament.

LOQUAT.

Giant [*Eriobotrya Japonica*] (Plate XII—Luther Burbank, Santa Rosa, Cal.).—This Japanese fruit, long grown in a small way in the Southern States under the name Japanese Medlar, or erroneously “Japanese Plum,” is rarely seen in the Northern markets. In the cities of Florida and Louisiana it can now usually be found during the months of March, April, and May, and somewhat later and less abundant in the warmer parts of California. It is a small fruit somewhat resembling a yellow plum in appearance, but covered with a short fine down. It is borne in large terminal spikes on a dwarfish somewhat straggling tree with large oblong rugose evergreen leaves that are downy beneath. The fruit contains one or more large, smooth, brown seeds, and is of a delicious, slightly acid, flavor. It is marketed in small baskets like strawberries. Near New Orleans, La., and Jacksonville, Fla., its culture has been found exceedingly profitable on well-drained, moist, rich lands. It does not succeed so well in California owing to the damage done to the blossoms by frost, as it blooms in winter. The variety illustrated is the “Giant,” regarded by the Japanese as the best they have. Its conduct in this country does not indicate that it is superior to many seedling trees in any essential point.

ORANGES.

Boone (C. A. Boone, Orlando, Fla.).—An early orange grown from seed secured from oranges bought from a foreign vessel at Tampa, thirty-five years ago. Valued for its earliness and good quality; fruit large, roundish, with a moderately smooth skin, slightly tinged with red and very thin; flesh tender, juicy, sprightly, quality good.

Higley Late (E. H. Hart, Federal Point, Fla.).—A late, medium-sized orange, rather dark in color. A good keeper and shipper, of fair quality.

Onoro (Lyman Phelps, Sanford, Fla.).—A light colored orange of medium size, thin skin, heavy juice, and brisk, sprightly flavor; quality excellent. Season early. A very good orange in December and continuing until April.

Tephia (Lyman Phelps, Sanford, Fla.).—Large, round, light orange in color, with a thin skin and delicious tender pulp. The name is from the Hebrew, signifying tender.

LEMON.

Agnes (F. A. Kimball, National City, Cal.).—Seedling grown by Mr. Kimball from seed taken from a lemon sent him by Mrs. Agnes Harris, wife of United States Senator John S. Harris, of Louisiana. The tree is nearly thornless and has very heavy foliage. Buds set in a lime root in 1881 produced before the end of the third year 1,060 marketable lemons. Fruit medium size, oblong, with a very large irregular oblique point. Acid sharp, pleasant. A promising variety with almost no seeds.

PROMISING WILD FRUITS.

Buffalo Berry [*Shepherdia argentea*] (Plate XIII—Agnes M. Johnson, Laurel, S. Dak.).—This wild fruit recently introduced to cultivation is worthy of attention in the cold northwest. It is perfectly hardy and exceedingly productive, the branches being thickly studded with the currant-like fruit. It is a shrub from 5 to 18 feet high, with cuneate oblong leaves, silvery on both sides, and holds its fruit well into the winter. The fruit is both red and yellow in color, with a single slender seed and agreeable acid pulp. It makes an excellent jelly and is delicious for dessert when dried with sugar. It is easily propagated from seeds, but being dioecious is better propagated by layers or suckers from pistillate individuals with a few staminate plants to insure the setting of the fruit.

PERSIMMON.

Marion (Samuel Miller, Bluffton, Mo.).—This native persimmon is a large handsome fruit with few seeds, ripening in October. The original tree was found growing near Fulton, Mo., on land owned by J. H. Marion and is said to have larger leaves and blossoms than the common persimmon. J. L. Normand, of Marks ville, La., also sent two varieties, one very large, and one nearly seedless, that are promising.



COSTATA, JAPANESE PERSIMMON (*DIOSPYROS KAKI*).



GIANT LOQUAT (ERIOBOTRYA JAPONICA)



BUFFALO BERRY (*SHEPHERDIA ARGENTIA*)

NUTS.

Hales (Henry Hales, Ridgewood, N. J.).—This hickory nut was illustrated in 1884 by Mr. Andrew S. Fuller, who says he first became acquainted with it about 1869. This nut is among the largest of the little shellbark species. Its shell is very thin; in cracking qualities it is not best, many halves of the kernels being broken or marred by the shallow, though clasping partition walls. It ranks among the best having a large plump kernel of high quality.

Curtis (A. J. Coe, Meriden, Conn.).—A hickory nut raised by Curtis Coe, an uncle of our correspondent and the originator of the Coe Transparent cherry. He planted the nut from which this came in 1859. The tree is now 8 inches in diameter at 6 feet above the ground; it stands near the original tree of the cherry. The nut is medium in size, has very slight angles and may be rated among the best in thinness of shell, fullness of kernel, and ease with which the kernel can be removed in halves. Its flavor is good and it is said to be very productive.

Ideal (George J. Streator, Garrettsville, Ohio).—A hickory nut, in size among the largest of the little shellbarks. The shell is moderately thin, but the cracking qualities are not the best. The quality of the kernel is good.

REVISION OF FRUIT NOMENCLATURE.

The work of revising our fruit nomenclature may now be considered as well begun. The apple list is under way and it is hoped will be ready for publication during the year. By this revision it is aimed to make a simplified list of all known varieties grown in this country, indicating as far as possible their proper synonyms and dates of origin. For the convenience of those who have no means of access to the rules of the American Pomological Society, in accordance with which the work is being done by this division, they are published in this report, with the additions made at the last biennial session:

RULES FOR NAMING AND DESCRIBING FRUITS.

Rule 1.—The originator or introducer (in the order named) has the prior right to bestow a name upon a new or unnamed fruit.

Rule 2.—The society reserves the right, in case of long, inappropriate, or otherwise objectionable names, to shorten, modify, or wholly change the same when they shall occur in its discussions or reports; and also to recommend such changes for general adoption.

Rule 3.—The name of a fruit should preferably express, as far as practicable by a single word, a characteristic of the variety, the name of the originator, or the place of its origin. Under no ordinary circumstances should more than a single word be employed.

Rule 4.—Should the question of priority arise between different names for the same variety of fruit, other circumstances being equal the name first publicly bestowed will be given precedence.

Rule 5.—To entitle a new fruit to the award or commendation of the society, it must possess (at least for the locality for which it is recommended) some valuable or desirable quality or combination of qualities in a higher degree than any previously known variety of its class and season.

Rule 6.—A variety of fruit having been once exhibited, examined, and reported upon, as a new fruit, by a committee of the society, will not thereafter be recognized as such so far as subsequent reports are concerned.

A rule governing the revision of names was authorized by the society at its meeting in Washington in September, 1891, as follows:

Prefixes, suffixes, apostrophic terminations, and secondary words, together with words whose significations are expressed in the descriptive columns of the catalogue, are eliminated from the names of fruits, save in a few cases in which they may be useful to insure the identity of a variety and in a few time-honored names.

The anglicising of foreign names is resorted to only in the interest of brevity or pronouncability.

In questionable cases, subsidiary words are retained in parentheses.

A TREE PROTECTOR.

There is a pressing need for something to prevent injury to the trunks of trees. In the central prairie States, in particular, rabbits often destroy whole orchards by gnawing off the bark in winter time. In

Texas I have seen the same thing occur in midsummer, as rabbits are usually numerous there. In the extreme Northern States the severity of the winter often causes the trunks of apple trees to become diseased and in some cases to die. The very hot sun in midsummer also seriously affects the south side of trees, making large blemishes, which sometimes prove fatal.

In addition to the testimony of many correspondents, I know, from about twenty years' personal experience in Kansas, that it is useless to depend on washes of any kind to prevent under all circumstances the depredations of rabbits. The only sure method is to surround the bodies of the trees with some material which they will not gnaw. Corn-stalks and coarse grass tied fast with strings, hay ropes, rags, and paper wound about them, are commonly used and are cheap, but perishable, and have to be annually renewed. A piece of closely-woven wire netting, about 12 by 18 inches, bent about the tree and fastened by a wire makes a surer protection, and costs about 3 cents. It will also stop the eating of the bark by mice and prevent the beetle of the round-headed borer from laying eggs and will last for several years. A bunch of soft grass stuck in the top will keep it in proper position and allow no chafing of the tree. Another cheap and durable protection is made from wire and plastering lath or other wooden strips. It has been used in a small way for many years, but only within the last three years has it been put prominently before the public. Mr. A. J. Phillips, of Wisconsin, has led in this work. Prof. E. S. Goff gave an accurate description of this method in the Report of the Wisconsin Horticultural Society for 1891. Cypress or cedar plastering laths are best where easily procured, but those of pine will last very well. Cut in two pieces they are about the right length, but longer strips can be used if necessary for the better protection of tall trunks. Six laths make a protector large enough for a small tree, but seven or eight are more commonly needed to prevent renewal until the trees have attained an independent age. The accompanying drawings will, in a measure, explain themselves (Fig. 1 showing the method of manufacture and Fig. 2 the protected tree). The following description of the protector and directions for making are quoted from Prof. Goff, with some amendments:

The wire used is about No. 18 in size, and may be of iron, brass, or copper. Brass and copper are more durable than iron, but their greater cost will overbalance this advantage. As a rapid means of measuring off the wire it may be wound length-

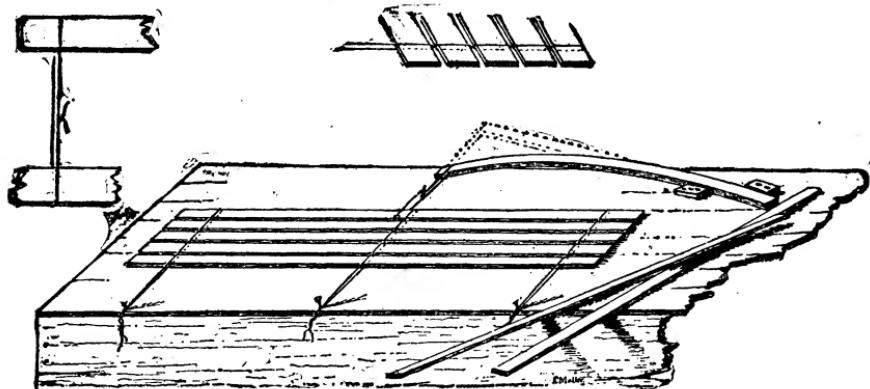


FIG. 1.—Method of manufacture of tree protector.

wise about a piece of board 18 inches long for an eight-lath protector or $16\frac{1}{2}$ inches if seven laths are to be used. The wires may then be cut at one end of the board

with the cold chisel or tinner's shears. The protectors may be rapidly put together on a common work bench by means of the simple device shown in Fig. 1. Procure a piece of strong elastic wood about 4 feet long and three-fourths of an inch thick to serve as the spring shown in the drawing. Then tack two blocks to the top of the bench near the rear side to serve as a support for the spring. Now, drive three nails into the bench near the front side, at the distance apart at which the wires are to be placed on the protector. The end wire should be about 3 inches from the end of the laths. Next, twist the ends of the wires together for a short distance, beginning about 3 inches from the end, and place one of the wires about each of the nails in the front of the bench, as shown. Place another shorter wire, having the ends bent into hooks, as shown at the left side of the drawing, about the outer end of the spring and slip the first lath through the six wires, as shown in the drawing, bend-

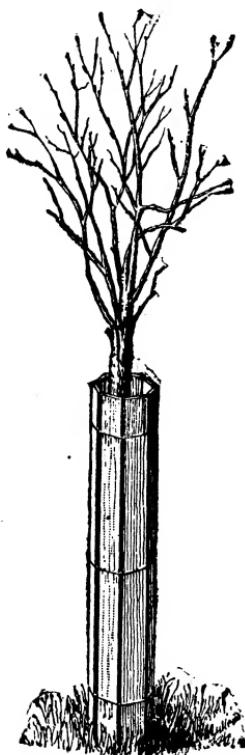


FIG. 2.—The protected tree.

ing the springs sufficiently to make this possible. The spring now acts as a tension to keep the wires taut. Insert the second lath, lifting up the lower strand of wire and slipping the lath between that and over the other strand, thus crossing the two strands. Then with a hammer gently drive up the second lath toward the first till the two are about one-fourth of an inch apart. Insert the other laths in the same manner, after which unhook the wire connecting the spring with the first lath and loosen it from the protector. In placing the protector about the tree, simply bend it around and insert the free ends of the wires beneath the wire of the first or second lath, clinching it enough to hold securely as shown in Fig. 2. The protector is to be left on summer and winter, until the tree outgrows it, or the wires rust off. The protector not only prevent sun-scald on the trunk, but is an effectual preventive from rabbits and other rodents, as well as from whittle-trees used in cultivation.

**FRUIT CULTURE IN MINNESOTA, WISCONSIN, SOUTH DAKOTA,
AND IOWA.**By JOHN S. HARRIS, *Special Agent.*

The territory in which my work has been located is so vast in extent that only a small proportion of it could be gone over, and that very hastily, in the three months' time allotted me. Minnesota alone extends north and south 500 or 600 miles and shows a great diversity of soil and climate. There are three or four districts in the region lying between Lake Michigan and the Rocky Mountains, north central Iowa and Minnesota, that differ so greatly in climatic conditions that they will probably require specific varieties for each. In some of them it is not unlikely that we may be in the future largely dependent for fruit upon improvements—not yet accomplished—of varieties and species nearest indigenous to these points, unless our experiment stations develop the fact that trees and plants procured from like climes may be found to flourish here. For some time to come fruit culture here must necessarily be experimental work. There are a few men in portions of the region who are succeeding reasonably well with a few varieties. They are giving them intelligent attention with the head, the hand, and the heart; that is, they study the business, enter into it with a spirit of determination, make judicious selections of varieties, and give them good cultivation and almost undivided attention. Their experiments have been costly ones in the past, and the work is still too great and costly for individuals to undertake. I believe it is entirely safe and within bounds to make the statement that of all the apple trees planted in Minnesota between the years 1852 and 1885, aside from the Oldenburgh, Tetofsky, and Wealthy, and some half dozen belonging to the Siberian species, not over one tree in fifty has lived and thrived long enough to produce for the planter to exceed one peck of apples each; while the exceptions named, when properly planted in suitable locations and properly protected, have very generally rewarded the planter with liberal quantities of fruit, and have frequently proved the most paying investment on the farm.

Since the great disaster of 1884-'85 our people have been more careful in the selection of varieties, making the Oldenburgh the leading one, and filling out with the Wealthy and such of the newer Russians as could be secured. The results in the last three years indicate that this will become a very good apple-producing country as soon as hardy varieties can be found to prolong the season, and the people become educated up to the better methods of planting and managing orchards.

THE FRUIT CROP OF 1892.

In some respects the season of 1892 was an unfavorable one for orchards. Although the previous winter was not an unusually severe one, and the spring opened as early as the average, vegetation came forward very slowly. Fruit trees and plants were from fourteen to sixteen days later in coming into bloom than in the preceding year. The bloom was more profuse, and the promise seemed better than in any previous year, but the final result was a partial failure or short crop of all fruits but the blackberry, except in a few of the more favored localities. My investigations would lead me to attribute this to (1) excessive rainfall during the blooming season, low temperature at some periods, and a very general scarcity of the insects that usually work on flowers

and effect pollination; (2) the mildew and leaf-blight or scab, induced by sudden changes in the temperature, an atmosphere overcharged with moisture and a lack of sunshine. The latter occurred or became visible between the 1st and 10th of June. It first appeared as a grayish mildew on the underside of the foliage, on the stalks of the leaves, and stems of the newly formed fruit. In many instances the leaves turned yellow and brown, and finally dropped off, leaving some varieties nearly defoliated and presenting a sad appearance; the fruit also dropped to the ground. All varieties were not affected alike, nor did all localities suffer in the same degree; in fact, some varieties were entirely exempt, at least in certain sections. This trouble extended over the greater portions of the States of Wisconsin, Minnesota, and the extreme northern part of Iowa, being found at its worst in Wisconsin, and along the eastern borders of Minnesota and Iowa, gradually assuming a milder form farther west on the high table-lands and prairies beyond the Mississippi River. The fruits most affected were, (1) the native plum (*Prunus Americana*), the crop of fruit proving a total failure except in rare instances, while the trees of some varieties have suffered great injury to the season's growth; (2) the Siberian crab-apple species, the Transcendent, which is the variety most extensively grown, being about the worst (only in the most favored localities was any of this class of fruit produced); (3) what are termed American varieties of the apple, or varieties that have had their origin in this country, and are descendants of the varieties originally introduced from western Europe, or that have long been cultivated in this country. These have fared about in the order named: Fall Queen (synonym *Haas*), Edgar Red Streak (synonym *Walbridge*), Tolman Sweet, Fameuse, Golden Russet, Ben Davis, Willow, Perry Russet, Plumb Cider, Bailey Sweet, St. Lawrence, Malinda, Utter, McMahon, and Wealthy. This list comprises all of the varieties of American apples that have at any time been successfully grown there.

The Oldenburgh, a considerable number of the Russian varieties of recent introduction, and a number that have been originated from seed of the Oldenburgh, have proved nearly or entirely exempt from this malady, and wherever the orchards of them have reached a bearing age they have produced good crops of fair fruit, except in some of the lower valleys and very sheltered locations; and even there the foliage and the season's growth have been good. It is true that of the newer Russians and their seedlings, but few have been planted long enough and in sufficient quantity to determine what they might do under all circumstances. The Oldenburgh is pretty thoroughly tested, and has proved to be all right in foliage, while the fruit is entirely free from scab. This one variety comprises at least one-third of all the fruit produced in the Northwest, and probably two-thirds of all that is produced in excess of the wants of the grower. The crop of the Wealthy has been next in magnitude and perhaps equal in value, because, being less perishable, it need not be rushed to market in excess of the demand. The remainder of the apple crop has been divided among a considerable number of varieties that have generally been planted in such limited quantities or numbers that their commercial value is almost untested. It is noticeable that every seedling that can be traced directly to the Oldenburgh for origin is more healthy in tree and in foliage than are seedlings of American origin; but only a few have keeping qualities, and the fruit of many of them is lacking in the finest quality and flavor.

FRUIT AT THE FAIRS.

INTERSTATE FAIR (LACROSSE, WIS.).

At the Interstate Fair, held at Lacrosse, Wis., August 29 to September 3, there was quite a large exhibit of apples, made mostly by professional growers, as follows: E. Wilcox & Sons, of Lacrosse; A. J. Phillips, West Salem; William Fox, Baraboo, and C. Morgan, of Forestville, Minn. Owing to the earliness of the fair and the extreme backwardness of the season, only the earliest varieties were in fit condition for showing to the best advantage, and winter varieties were not colored up or full grown. Russian varieties showed best, being generally nearer mature, smoother, and more shapely, and nearly or entirely free from scab. The Transparent and Oldenburgh families were fine and fully ripe, and in better condition than they are usually at our fairs. Patten Greening and Iowa Beauty were unusually fine. The leading American varieties were not as fine as usual and were badly affected with scab. The Siberian species were conspicuous by their scarcity, but very few plates being shown. Whitney alone was up to the usual standard in size, quality, and beauty of appearance. A few varieties of seedlings were on exhibition, but were not mature enough to test their merits. No grapes were ripe enough to make a good showing. The crop of native plums being a failure, none of them were shown.

MINNESOTA STATE FAIR.

The Minnesota State Fair was held at Hamlin, Minn., September 5-10. A week of pleasant weather had wrought great improvement in the condition of the fruit, although many varieties were not yet mature. The exhibit of apples was large, fully as large as has ever been made in the State, numbering altogether some 1,500 plates. Many of the varieties were not as large and finely colored as in some previous years. The exhibition was chiefly from Hennepin, Washington, Ramsey, Dakota, Carver, Rice, Wabasha, Goodhue, and Nobles counties; but small exhibits of single or few varieties from other quite remote sections of the State were seen. In quantity Ramsey County took the lead, closely followed by Hennepin, Rice, Dakota, and Carver counties. Owing to the chaotic condition of the nomenclature of the new Russians, I am unable to state how many varieties of them were on exhibition. Nearly one hundred were claimed, but I could not distinguish with certainty more than sixty, and I think that thirty of those would not be seriously missed if they were lost altogether. The best single collection of new Russians was shown by Andrew Peterson, of Carver County—the best because all were fair in size and appearance, and the varieties, twenty in all, were not shown under more than one name each. In native seedlings, J. G. Miller, of Rice County, showed the greatest and most promising collection—about twenty varieties. A number of single varieties were shown from various parts of the State.

The grape exhibit was very large, comprising more than fifty varieties, but the fruit was not sufficiently ripe to show at its best, few varieties being fit for eating. The grape interest promises to become a large one in this State, and I am glad to be able to report that backward as the season has been, the crop fully matured and was saved before the occurrence of killing frosts.

WISCONSIN STATE FAIR.

The Wisconsin State Fair was held at Milwaukee, Wis., September 12-17. The exhibition of fruit at this fair was a surprise to the great majority of the visitors present, because the impression had gone out that the fruit crop was a failure. In the southeastern section of the State, which has always in the past contributed the larger portion of the exhibits of the fairs, the crop was a failure, and in only a few limited sections was it really good. The entire exhibit comprised over 3,000 plates of apples, besides the grape show of several hundred plates. A very large proportion of this fruit came from Sauk County, and was grown on the highlands about Baraboo. A fine exhibit was also made from Richland County that was grown on the highlands between the Wisconsin and Mississippi rivers. Another good exhibit came from Lacrosse County, grown on the bluffs from 400 to 500 feet above the valley. There was also a small exhibit from Oconto County, which is the most northern limit where orcharding has been tried. I was disappointed in not seeing some of the noted Waupaca seedlings among the exhibit. The show of Russian varieties was large and fine, nearly one hundred varieties being claimed; in fact, had they not been in the exhibit the fruit part of the fair would have been decidedly inferior. Almost all of the older American varieties were below the average in appearance, on account of this being a nonbearing year and the unusual prevalence of the scab, while the Russian varieties were fair, well developed, and free from scab. A considerable proportion of the Russians are early varieties, and but a few of them really late, long keepers. As the season was unusually backward (estimated to be fully three weeks), a number of varieties were shown in their greatest perfection that ordinarily are not seen at our fairs on account of their earliness and perishable nature. The largest exhibit of Russians was made by A. G. Tuttle, of Baraboo, who has the oldest and largest orchards of them in the Northwest. Other exhibitors of Russians were C. Hirschingher, George Townsend, Mr. Palmer, and William Fox, of Sauk County, and A. L. Hatch, of Richland County. Samples of the best of these, except the extremely early, were selected and forwarded to the Department of Agriculture, at Washington. I found here, as in Minnesota, that the nomenclature of the Russian varieties is very uncertain, and that it will require years of careful work to sift out the correct names and get them placed where they belong, and then sift them down to one or two of the best of each family and season. As an example, of the Oldenburgh class (which resemble each other in tree, fruit, and season so closely that if mixed together a committee of experts could not sort them out) there were shown Charlamoff, Glass Green, Arabian, Borovinka, and two or three others. Then there is the Hibernal, Lieby, Ostrokokoff Glass, and Recumbent that, if not one and the same variety, do not differ enough to make more than one of them desirable in any orchard. A very fair exhibit of pears was made; but this fruit can not be successfully grown, except near the shores of Lake Michigan. There were a few new seedlings on exhibition, but they very generally showed too much scab to be really valuable. Among seedlings of recent introduction the specimens of Patten Greening were perfect in appearance, rivaling the Wolf River and McMahon in size. The exhibition of plums was very light, only four or five varieties altogether, the Lombard taking the lead.

HOUSTON COUNTY (MINN.) FAIR.

At the Houston County Fair, held at Caledonia, September 20-24, the exhibition of apples was small, but very select, and about equally divided between Russians and Americans. I here got track of a number of varieties of seedlings, and some which seem to be really promising.

FREEBORN COUNTY (MINN.) FAIR. -

The last fair visited was that of Freeborn County, Minn., September 29-October 1. The exhibition of apples at this fair was by far the finest I have seen anywhere this year, and the best, considering the number of varieties—some fourteen of the older ones and about thirty of the new Russians, new seedlings, and varieties of recent introduction. The great bulk of the exhibit was composed of the Oldenburgh and Wealthy, they being the only varieties planted in large quantities. The Utter, Malinda, Patten Greening, and Hibernal are succeeding so well in this county that they will be planted more freely in the future until something better and more reliable is found.

ORCHARDS VISITED.

SAUK COUNTY, WIS.

At Baraboo, Wis., A. G. Tuttle has an orchard devoted exclusively to the newer Russian apples. It originally contained about a hundred varieties. Some varieties proved too tender for the climate, or so subject to blight that they have died out, but about sixty still remain. These, with the exception of two or three varieties, appear to be healthy, thrifty, and vigorous. The foliage was not apparently affected in the least by the scab or leaf blight, and they were generally carrying a good crop of fruit. An Oldenburgh orchard adjoining is also free from the same trouble, while in an orchard of mixed American varieties near by the trees are badly affected, none of them producing much fruit and some of them being half defoliated. Fameuse, Fall Queen (synonym *Haas*), Plumb Cider, Tolman Sweet, and Golden Russet were among the worst. The most valuable of the new Russians seem to be Glass Green, Yellow and White Transparent, Charlamoff, Hibernal, Antonovka, Vargul, Red Wine, Czar Thorn, Zusoff Winter, Longfield, Early Champagne, and Beautiful Arcad. The Repka Malenka also appears to be a good tree, and the longest keeper of them all, but the fruit is too small to become popular.

LACROSSE COUNTY, WIS.

In the orchard of E. Wilcox & Sons, of Lacrosse, Wis., the crop of fruit was below medium in quantity and quality, having suffered severely from scab, blight, and curculio. In this orchard but few new Russians are yet in bearing. No variety looks more promising than Hibernal. Scott Winter apple is apparently hardy when top-worked on crab stock and bears heavily every year. It has some scab this year. Mr. Wilcox's seedlings are not bearing enough this year to judge of their merits.

HOUSTON COUNTY, MINN.

The orchard of William Oxford, of Freeburg, on high bluff limestone land, is the best in the county, and shows very little scab or disease, except on Fameuse, Fall Queen (synonym *Haas*), Edgar Red Streak

(synonym *Walbridge*), and Tolman Sweet. All varieties are fruiting to their fullest capacity. Hibernal and one unknown Russian of the Anissim family are the best Russians. A variety is found here that I have not met with at any other place that seems to be hardy and fruitful, and the fruit is superior in quality to most of the Russians. The fruit is medium in size and of a smooth, round form, light yellow color, with pale blush on the sunny side. The flesh is pale yellow, fine grained, and the flavor pleasant, subacid. Season this year, November; origin, unknown. There are other good orchards in the towns of Brownsville, Hokah, Union, and Caledonia. I have found a few promising seedlings in the towns of Hokah and Union. A few of them were sent on to the division, and I think T. Johnson's No. 2 will become a very valuable fruit to follow the Oldenburgh in case it proves entirely hardy. It is large to medium in size; flattish round in form; color, greenish yellow, striped with red; flesh, fine grained, yellowish white, pleasant, subacid; season, November, but said to keep till Christmas. The tree is about sixteen years old. Three-fourths of the fruit raised in the county this year was Oldenburgh. About 1,000 bushels were sold to go out of the county.

FILLMORE COUNTY, MINN.

The orchards of Fillmore County are confined largely to the orchards of Forestville, Etna, and Spring Valley. The crop of fruit in this county was very fine. The varieties grown are chiefly Oldenburgh and Wealthy. The surplus sold to go out of the county is estimated at 5,000 bushels. I find the Malinda doing well here. There are also nearly a dozen seedlings of the Oldenburgh in the county. Walker's No. 1 and Nelson's No. 6, of Spring Valley, are good and fair-looking fruit, about the same season as the Oldenburgh. Krugel's No. 5, of Forestville, will keep until midwinter; is a medium-sized, fair-looking fruit; tree, very good; the quality of fruit not the best.

MOWER COUNTY, MINN.

In Mower County less fruit is grown than in Fillmore County. Oldenburgh produced a bountiful crop wherever the trees were old enough to bear. I found very few trees of any variety doing well. There is one seedling in the town of Lyle that may prove worthy of looking after on account of its long-keeping quality. It is a conical, medium-sized, red-striped apple that is said to keep until June. It is quite acid, but may tone down as it approaches ripeness. The tree was breaking down under the load of fruit; has stood well where Malinda, Wealthy, Fall Queen, and Edgar Red Streak were killed to the ground.

FREEBORN COUNTY, MINN.

The fruit crop of Freeborn County was remarkably fine. The bulk of the crop was Oldenburgh and Wealthy. Oldenburgh apples were shipped from Albert Lea by the car load into Iowa and Missouri—States from which this country has received large supplies of apples in previous years. The surplus sold to go out of the county was 2,000 to 3,000 bushels. In this county I found a considerable number of Malinda and Utter trees doing well. A seedling sweet apple by A. C. Wannamaker, of Albert Lea, is a good fruit, and tree may prove more hardy than Tolman Sweet.

FARIBAULT COUNTY, MINN.

This county also produced a very fine crop of fruit; surplus sold to go out of the county estimated at 2,000 bushels. Here was found the largest Wealthy orchard in the State. It contains 1,500 trees which were bearing to their fullest capacity. A considerable number of seedlings producing a fair quality of fruit, were also found.

MARTIN COUNTY, MINN.

In Martin County is a seedling orchard of twenty trees, said to be about thirty years old. The trees have the appearance of being very hardy, but the fruit is too small in size to be worth retaining, unless it shall be found that better varieties will not ultimately succeed here. The fruit crop was fairly good in this county, but the orchards are generally too young to afford a surplus. I found one very fair seedling sweet apple on the farm of H. S. Livermore, of Fairmount, and on his place the Malinda and Utter are fruiting well and trees looking healthy.

WINONA COUNTY, MINN.

In Winona County the fruit crop was nearly a failure in the valleys but was fair on the bluffs and highlands. There are three seedlings of the Wealthy on the place of O. M. Lord, at Minnesota City. The trees were free from blight where all other varieties blighted badly. The quality of the fruit would range from good to very good; trees too young to determine their ultimate hardiness.

OLMSTED COUNTY, MINN.

No new seedlings of any great value were found in Olmsted County. At Rochester is situated the largest orchard in the State, owned by Mr. R. C. Keel. There have been planted in the orchard over 150 varieties, very few of which have proved of any value for this climate. The leading varieties are Oldenburgh, Wealthy, and Longfield, which are being grown in large quantities for commercial purposes. The crop harvested this year was over 3,500 bushels. A considerable number of the Russian varieties have been planted here, but as the nomenclature is badly mixed, I could not determine which were promising the best, aside from the Longfield, Ostrokokoff, and Hibernal. The surplus sold to go out of the county was estimated from 5,000 to 6,000 bushels. There are a number of young orchards in the county that are promising, the largest being probably that of William Somerville, of Viola. He has over fifty varieties of new Russians, now of bearing age, and is continuing to plant largely of these. He has great faith in their value for this climate, but owing to the uncertainty as to their being correctly named, is unable to give full statistics upon their relative value. This county, owing to the elevation of the land and the texture of the soil, bids fair to be one of the best apple regions of the Northwest.

STEELE COUNTY, MINN.

There are few promising orchards in Steele County. None of the older varieties have succeeded well, except the Oldenburgh. That variety has fruited well this season. From an orchard of $2\frac{1}{2}$ acres, planted out in the spring of 1885 near the city of Owatonna, 315 bushels of merchantable apples were gathered this year. Older orchards have done equally well in proportion to their age. Surplus sold to go out of the county, 2,000 bushels.

RICE COUNTY, MINN.

This county has gained some notoriety from being the home of the Peerless. J. G. Miller, the originator of that variety, is an enthusiast in the propagation of seedlings, and has now a considerable number coming forward. The varieties from which seed were taken are largely Peerless and Oldenburgh. Such of them as have commenced fruiting generally produce fruit of fine appearance and fair quality. None of them, however, will keep longer than Peerless.

HENNEPIN COUNTY, MINN.

Owing to its proximity to the cities of Minneapolis and St. Paul, which afford good markets, and the peculiar adaptation and favorable conditions existing around Lake Minnetonka, considerable attention is paid to gardening and fruit culture, and I found a great number of young and promising orchards, small fruit plantations, and vineyards. Nothing new has developed in the experiments of Peter M. Gideon, of Excelsior, since my visit there two years ago. The location is one peculiarly subject to fire and twig-blight; and the crop this season is only moderate. His experiments have been largely for the purpose of securing hardiness of tree by using the crab and Siberian crosses, crossed with the hardier apples as the foundation. The result is a race of apples considerably larger and better than the Siberians, but generally not large enough to become popular for commercial purposes. Although some of them are as hardy in tree as any of the Siberians, most of them seem predisposed to blight.

At Long Lake there are some fine orchards, chiefly of Oldenburgh and Wealthy. At Mrs. C. W. Gordon's there are a few seedlings that fruited for the first time this year. Three or four of the varieties were of average size and fair appearance, but were not sufficiently ripened to test their quality. In this vicinity it is the practice to set trees very close, usually about 16 feet apart, and train with low heads, or really give no training. Cultivation soon becomes impracticable and is abandoned. It is my opinion that the trees will soon become unfruitful, or the fruit inferior in size and quality. In the orchard of George Smith, adjoining, I think was found a valuable object lesson. His trees are set at a greater distance apart, and the ground is kept very heavily mulched with barnyard and hog manure, and the result is that the trees bear liberal crops every year. This year they are bearing to their fullest capacity, and at the same time making a healthy, vigorous growth. The fruit is larger in size than that in the adjoining orchards. Mr. Pierce, of Chowan, has out a large young orchard that looks very promising. It is chiefly double or top-worked. His trees are what he terms whole root. His method of propagating is to plant the seeds for the roots, crown-graft when two years old without taking up, using for scions the Virginia or Tonka crabs, or some variety of undoubted hardiness. These make a growth the first year of from 4 to 5 feet; in autumn they are taken up and buried for the winter, and the next spring are set in orchard, and top-worked with such varieties as are desired. The plan seems to work well, and I saw numbers of the trees only four years from the root-graft carrying considerable fruit. Hibernal is proving a great success; also the Charlamoff and Good Peasant. The Tonka crab is free from blight, a strong and vigorous grower, and one of the best of the species.

CARVER COUNTY, MINN.

In Carver County, at Waconia, is found the oldest orchard of new Russian varieties in the State. The orchard is planted on a warm, deep, rich, sandy loam soil, and has always until the present year received very thorough cultivation. The trees of many of the varieties have suffered greatly from blight. This orchard is owned by Andrew Peterson. Only about twenty varieties are doing reasonably well, and are as free from blight as Oldenburgh, or more so. The list stands as follows: Borovinka, Charlamoff, Cross, Good Peasant, Krimskoe, Blushed Calville, Christmas, Anisovka, Jungfrau, Plikanoff, Hibernal, Lieby, Kluevskoe, Royal Table, Reinette, Red Repka, and Nos. 502 and 469. Patten Greening is doing well with Mr. Peterson, and he thinks it bids fair to become a valuable variety for this region, for the reason that it is free from blight. P. D. Anderson, a neighbor of Mr. Peterson, has a very promising seedling, size medium, form round oblate, color yellow, mostly covered with bright red, and sprinkled over with fine gray dots; stem medium, short, elastic, set in a broad greenish-yellow cavity; calyx half open, in a broad, medium deep corrugated basin; flesh yellowish white, fine grained, firm; flavor subacid, sweet; core, small and closed; season, winter.

Beyond and west and north of Carver County but little success has followed the attempts at apple culture. Here and there may be found a few trees and sometimes considerable orchards of the Siberian species doing fairly well, and were it not for their predisposition to blight they would fill an important place in our pomology for the more uncertain districts. In a few instances I met with the Oldenburgh, but no American variety seems to have been found that may be planted with a certainty of living to produce fruit. The hope of this vast region of territory lies in the finding of a few of the hardiest Russians and seedlings yet to be produced from them that will prove to be adapted to these trying situations.

EXPERIMENTAL WORK.

In the test orchards under the charge of Prof. Samuel B. Green, on the State Experimental Station at St. Anthonys Park, are planted some three hundred varieties of apple trees, ranging in age from six to fourteen years. About two-thirds of them are of the newer Russian varieties. The winter after the planting of the oldest trees was a severe one, and many of them were killed back a full season's growth. To give these trees the most thorough possible test, they were planted on level ground without any surrounding protection and upon the most exposed portion of the farm. They were given fertilization and clean culture. As fast as varieties have killed out, others have been set in their places. Such varieties as blight hopelessly or produce fruit that is of no value will be discarded or noted on the record as such. Thus they will be gradually sifted down to only such varieties as produce good fruit and are undoubtedly hardy. At the present time the most promising and free from blight are Nos. 245, 187, 599, 140 M., 469, 169, 152 M., 282, 65 M., Borovinka, Glass Green, Romenskoe, Czar Thorn, Grandmother, Green Sweeting, Voronesh Reinette, Krimskoe, Breskovka, Anisovka, Cross, Zusoff Winter, Lieby, Bitter Pipka, Red Repka, Good Peasant, Hibernal. These varieties are of the oldest planting and a portion of them have fruited, but they may not all prove true to name. The trees of Glass Green and Borovinka are certainly of the

Oldenburgh family, if not the true Oldenburgh. The one marked Good Peasant is not true to name and does not answer to the description except in size, its color being a dark red instead of green, as described by Dr. Regel. The 152 Breskovka is a fine tree, free from blight, bearing young and fruit of fair quality for early, and it may take the place of Yellow and White Transparent where they can not be grown on account of blight. All new seedling varieties of apples are placed on trial as fast as they can be secured; apples and all other fruits for this latitude are being thoroughly tested. Considerable attention is being given to the originating of new varieties from seed, by selection, crossing, and hybridizing. An effort is being made to gather in some of the native wild fruits of this region, with the view of their amelioration and improvement through cultivation. The State Horticultural Society is working in harmony with the professor of horticulture and lending aid and encouragement in every possible manner.

EXPERIMENTAL TREE STATION AT OWATONNA.

This station is under the direction of E. H. S. Dartt, an old and experienced nurseryman and orchardist, and is really an auxiliary to the Central Station at St. Anthony's Park. It is considered to be in one of the most trying situations for fruit-growing in southern Minnesota, and any varieties that may prove adapted there will be safe to plant over the greater portion of the State.

It is designed to be a place for testing the Russian and other foreign varieties of hardy fruit; for gathering in and testing all seedling fruits of any promise already originated, or that may hereafter be originated, as fast as scions or trees can be secured; and for the continuous planting of seeds of hardy varieties produced in the far North, for the purpose of originating new, more hardy, and adapted varieties. In connection with the propagating ground and nursery is a trial orchard that now contains six hundred trees, of which there are seventy-five of the Russians, forty of Western seedlings and crabs, six of pears, seventeen of plums, Russian and natives, and three of Russian cherries. Some of the Russian varieties are blighting so badly that they will be removed, the names noted, and their place filled with something else; on account of the mixed condition of the nomenclature of the Russians, no doubt some of the names and numbers are duplicated. On this account the work of sifting out and getting down to the best will prove much more difficult than it would to ascertain the merits of varieties correctly named. One hundred varieties, less duplicates, of Russians are being propagated in the nursery, and nearly as many named varieties of seedling apples and hybrids, besides a great number of seedlings that have never fruited. The method pursued with the latter is, without waiting for fruiting, whenever a seedling shows more than usual vigor, large and healthy foliage, and freedom from mildew or blight, to root-graft about ten scions, recorded under a letter and number, so that if the variety prove hardy and the fruit desirable, plenty of scions can be had for distribution. Of the varieties under a name or number, originated in other places, six to twenty, according as they appear promising, are root-grafted, in order to get trees enough for a full and fair test. One hundred varieties have been started in this manner, and there remain four hundred that look too well to be discarded at present. As fast as any show that they will have no value they will be rooted out. With so many trees started from care-

fully selected seed we hope to get something that will endure our climate and produce an abundance of good fruit.

The experimental work in Minnesota is not confined to what can be done at these two stations. The State Horticultural Society has taken the matter in hand and has designated a number of individuals in different localities to follow up special work, the most important of which is to take on trial new seedlings and unknown varieties and give them a thorough test before the society shall indorse or recommend them for trial or general cultivation. These substations are to some extent receiving trees and plants from the Central Station, but no financial or other aid is extended from the State, and they are required to report annually to the professor of horticulture, who also is expected to render an annual report to the State Horticultural Society. In some of these stations the trial and testing of native plums is made a specialty.

